Common Core Standards - Resource Page

The resources below have been created to assist teachers' understanding and to aid instruction of this standard.

Domain	**Standard:** 7.RP.1 - Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
Ratios and Proportional Relationships **Analyze proportional relationships and use them to solve real-world and mathematical problems.**	Questions to Focus Learning How would you use a ratio to compute unit rates? What strategies would you use if the ratio contained fractions or unlike units? Ratios provide us a mathematical way to quantify and describe relationships. Student Friendly Objectives *Knowledge Targets* I know that a ratio is a comparison of two quantities using division. I can identify equivalent ratios. *Reasoning Targets* I can create equivalent ratios. I can write a ratio in lowest terms. I can write ratios to represent practical problems. I can write ratios of similar triangles and associate the length similarity as a ratio. I can use a given ratio to convert a measurement or rate. I can apply ratios to mathematical problems. I can apply ratios to practical problems. I can compare unit rates with ratios of fractions.

Vocabulary

common denominator
equation
equivalent
equivalent ratios
proportion
ratio
unit rate

Teacher Tips

Building from the development of rate and unit concepts in Grade 6, applications now need to focus on solving unit-rate problems with more sophisticated numbers: fractions per fractions.

Proportional relationships are further developed through the analysis of graphs, tables, equations and diagrams. Ratio tables serve a valuable purpose in the solution of proportional problems. This is the time to push for a deep understanding of what a representation of a proportional relationship looks like and what the characteristics are: a straight line through the origin on a graph, a "rule" that applies for all ordered pairs, an equivalent ratio or an expression that describes the situation, etc. This is not the time for students to learn to cross multiply to solve problems.

Because percents have been introduced as rates in Grade 6, the work with percents should continue to follow the thinking involved with rates and proportions. Solutions to problems can be found by using the same strategies for solving rates, such as looking for equivalent ratios or based upon understandings of decimals. Previously, percents have focused on "out of 100"; now percents above 100 are encountered.

Providing opportunities to solve problems based within contexts that are relevant to seventh graders will connect meaning to rates, ratios and proportions. Examples include: researching newspaper ads and constructing their own question(s), keeping a log of prices (particularly sales) and determining savings by purchasing items on sale, timing students as they walk a lap on the track and figuring their rates, creating open-ended problem scenarios with and without numbers to give students the opportunity to demonstrate conceptual understanding, inviting students to create a similar problem to a given problem and explain their reasoning.

http://illuminations.nctm.org/LessonDetail.aspx?id=L697

This lesson features two creative twists on the standard lesson of having students measure several circles to discover that the ratio of the circumference to the diameter seems always to be a little more than 3. This lesson starts with squares, so students can first identify a simpler constant ratio (4) of perimeter to length of a side before moving to the more difficult case of the circle. The second idea is to measure with a variety of units, so students can more readily see that the ratio of the measurements remains constant, not only across different sizes of figures, but even for the same figure with different measurements. From these measurements, students will discover the constant ratio of 1:4 for all squares and the ratio of approximately 1:3.14 for all circles.

Students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems. Students use their understanding of ratios and proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope. They distinguish proportional relationships from other relationships.

http://illuminations.nctm.org/ActivityDetail.aspx?ID=116

With this three-part online applet, students can explore with graphic and numeric displays how the circumference and area of a circle compare to its radius and diameter. Students can collect data points by dragging the radius to various lengths and clicking the "Add to Table" button to record the data in the table.

Vertical Progression

8.EE.5-1 - Graph proportional relationships, interpreting the unit rate as the slope of the graph.
8.EE.5-2 - Compare two different proportional relationships represented in different ways.
8.EE.6-1 - Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane.
8.EE.6-2 - Derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.

The above information and more can be accessed for free on the Wiki-Teacher website.
Direct link for this standard: 7.RP.1